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G 279,27 (8)

PATENT SPECIFICATION



Application Date : July 6, 1926. No. 16,919 / 26. 259,162

Complete Accepted : Oct. 7, 1926.

COMPLETE SPECIFICATION.

A Machine for Cutting Tubes of Cardboard or Paper into Rings.

I, GEORGE LAROCHE, of Avenue Jules
Quentin, Nanterre, Seine, France,
Engineer, a French citizen, do hereby
declare the nature of this invention and in
5 what manner the same is to be performed,
to be particularly described and ascer-
tained in and by the following state-
ment :—

10 The object of this invention is to pro-
vide a machine for cutting cylindrical
tubes of cardboard or paper into rings of
any desired width.

15 The invention consists in a machine
comprising a rotating overhung mandrel,
an annular chuck which grips one end of
the paper tube and surrounds and rotates
with the mandrel but is displaceable
axially relative thereto, automatic means
20 for feeding a cutter transversely to cut off
a ring from the projecting end of the
paper tube and for withdrawing the
cutter, and automatic means for periodic-
ally displacing the chuck axially a dis-
25 tance equal to the width of the rings
desired.

30 The mandrel is driven at high speed.
The movement of displacing the chuck
and tube axially along the mandrel takes
place when the cutter is withdrawn clear
of the tube, and the two operations of cut-
ting off a ring and displacing the tube into
the position for the next ring to be cut off
take place alternately and successively
35 until the whole length of the tube has
been cut into rings. When a tube has
been inserted in the machine, the rotation
of the mandrel is started, and continues
until the tube is completely cut into rings,
whereupon the rotation of the mandrel is
40 stopped, and a new tube is inserted.

The machine also comprises hand
operated means for returning the said
holding means into the initial position to
receive a new tube.

45 In the preferred form the machine com-
prises two circular cutting wheels

[Price 1/-]

mounted on slide rests one on each side
of the tube to be cut, which are alter-
nately moved at right angles to the axis
of the mandrel so as to effect the cutting
50 off of a ring. The displacement of the
tube along the mandrel is effected by
means of a rack and pawl mechanism.
Further, to permit of varying the relative
times for cutting off a ring and for dis-
55 placing the tube, means are provided for
disengaging the pawl from the teeth of
the rack, in such manner that one or
more strokes of the pawl carrier may be
made without producing any displace-
60 ment of the tube along the mandrel.

The invention is illustrated, by way of
example, in the accompanying drawings,
of which

Figure 1 is an elevation of the machine, 65
Figure 2 is a side view, and
Figure 3 is a plan.

The tube to be cut, *a*, is placed in
position round the mandrel *b* integral
with or fastened to the spindle *c* of the
70 machine, on which are mounted the fast
and loose pulleys *d* and *e* for the driving
belt of the machine. The tube *a* near
one end fits easily over a disc *f* grooved at
its periphery and fixed to the mandrel *b*.
75 The other end of the tube fits easily over
another disc *g* fastened to an annular
chuck surrounding the mandrel, and is
pressed thereon at several points by the
jaws or levers *h* of the chuck, which are
80 operated by the forked hand lever *h*⁴.
The chuck rotates with the mandrel, but
is slidable axially relative thereto. The
levers *h* are provided with rollers *h*² in
85 contact with an annular wedge *h*³ of the
chuck, which can be displaced axially by
means of the hand lever *h*⁴, so as to effect
the clamping of the tube *a* or to release it.
For this purpose, the annular wedge is
90 provided with an annular groove *h*⁵ in
which the forked end of the lever *h*⁴
engages.

The chuck is provided with a circumferential groove h^0 , in which fit blocks or rollers carried by a fork projecting from the carriage C, in a manner well known and clearly shown in the drawings; so that the carriage C, the chuck, and the tube a may be all simultaneously displaced axially along the mandrel b . This movement is obtained by means of a rack i fixed to the carriage and actuated by a pawl i^1 mounted on a slide block j movable horizontally in suitable guides on the frame of the machine. The slide block is actuated by a connecting rod k jointed on a crank pin k^1 fastened to a disc k^2 . The latter forms part of a sleeve l integral with a pinion m engaging with a toothed wheel m^1 . The latter is fastened on a shaft n , on which is also fastened a wheel o in gear with a pinion o^1 . This pinion is fastened on a shaft p carrying a worm wheel p^1 in gear with a worm p^2 cut on the shaft c .

Normally, the pawl i^1 is in engagement with the rack i , but it can be separated therefrom by a rocking lever q pivoted at q^1 and provided with a spring q^2 . This rocking lever is itself actuated by a lever r pivoted at r^1 , and carrying a roller r^2 in contact with a cam s fastened on the shaft n . The shaft n carries at its ends the bevel pinions n^1 n^2 which drive two corresponding pinions t^1 t^2 fastened on the shafts u^1 and u^2 respectively. On these shafts are fixed cams v^1 v^2 adapted to actuate the slide rests x^1 x^2 on which the cutters y^1 y^2 are mounted. These slide rests are movable in transverse guides, and are returned by springs.

The action of the machine is as follows:—The mandrel being at rest, a tube is placed on the mandrel and is clamped to the chuck by means of the levers h when the handle h^4 is moved to the left. The driving belt is then displaced from the loose pulley on to the fast pulley, by moving the control rod z . The spindle c , mandrel b and the tube a are thus driven at high speed. The worm p^2 drives the worm wheel p^1 and the shaft p on which it is fixed. The motion is transmitted by the pinions o^1 and o to the shaft n and to the shafts u^1 and u^2 . The pinions m^1 and m also drive the sleeve l , and consequently the crank disc k^2 turns at a suitably reduced speed, thereby imparting a to-and-fro motion to the slide block j and pawl i^1 .

When the rack i and carriage C are at rest, one of the cams v^1 or v^2 cuts off the end of the tube. During such cutting off, the tube is supported by the disc f , and the cutting edge of the cutting wheel can penetrate into the groove of the disc. The cutting having been effected, the

cutter is immediately withdrawn, the carriage and the chuck are advanced, in consequence of the engagement of the pawl with the rack, which it pushes in the direction of the arrow. The other cutter advances in its turn and cuts off a length of the tube equal to the axial displacement imparted to the tube a ; and so on.

The displacement of the rack does not take place during each stroke of the pawl, but only when the cam s and the play of the levers r and q permit the pawl to engage with the rack. The pawl may thus perform one or two strokes idly. This arrangement is intended to permit of a due apportionment of the relative times to be allotted for the cutting off and for the displacement of the tube. The time allotted for the cutting off comprises that of the return stroke of the pawl, and also the whole of the idle stroke or strokes. The time allotted for the displacement of the tube can thus be reduced, that is, the actual speed of operation of the machine can be accelerated.

When the cutting of the tube into a number of rings is completed, the driving belt is moved on to the loose pulley, the carriage C is returned to the left by means of a hand wheel 1 mounted on the carriage, and which operates a pinion 2 in gear with a rack 3 fixed to the frame of the machine. Another tube can be then placed on the mandrel, and the machine again started.

The stroke of the pawl is adjusted to correspond with the width of the rings desired. For this purpose the crank pin k^1 can be adjusted radially.

The arrangements hereinbefore described are given by way of example only; the forms, dimensions, materials to be employed, and other details can be varied to suit the requirements of any particular case, without departing from the essential features of the invention.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. A machine for cutting tubes of cardboard or paper into rings, comprising a rotating overhung mandrel, an annular chuck which grips one end of the paper tube and surrounds and rotates with the mandrel but is displaceable axially relative thereto, automatic means for feeding a cutter transversely to cut off a ring from the projecting end of the paper tube and for withdrawing the cutter, and automatic means for periodically displacing

the chuck axially a distance equal to the width of the rings desired.

5 2. A machine as set forth in Claim 1, comprising a carriage displaceable longitudinally along the frame of the machine and engaging with the chuck in such manner that carriage and chuck are displaced simultaneously with no relative longitudinal movement.

10 3. A machine as set forth in Claim 1, in which the cutting is effected alternately by two circular cutters mounted on opposite sides of the rotating mandrel and tube.

15 4. A machine as set forth in Claims 1 and 2, comprising an adjustable rack and pawl mechanism for effecting the displacement of the chuck.

5. A machine as set forth in Claim 4,

comprising means for permitting the pawl 20 to perform one or more strokes idly, for the purpose described.

6. A machine as set forth in Claims 1 and 2, comprising also hand operated means for returning the carriage and 25 chuck into the initial position to receive a new tube.

7. Machines for cutting tubes of cardboard or paper into rings, substantially as hereinbefore described with reference 30 to the drawings.

Dated the 5th day of July, 1926.

ARCHD. SHARP,
Chartered Patent Agent,
231, Strand, London, W.C. 2,
Agent for the Applicant.

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[This Drawing is a reproduction of the Original on a reduced scale.]

Fig.2.

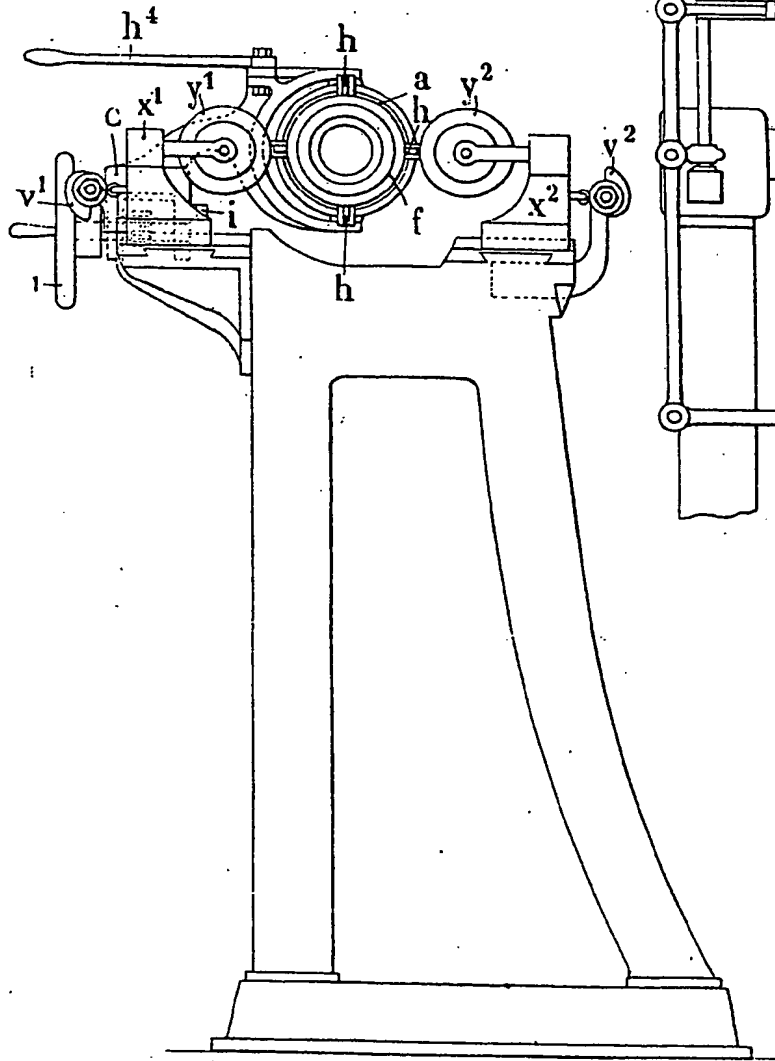


Fig.

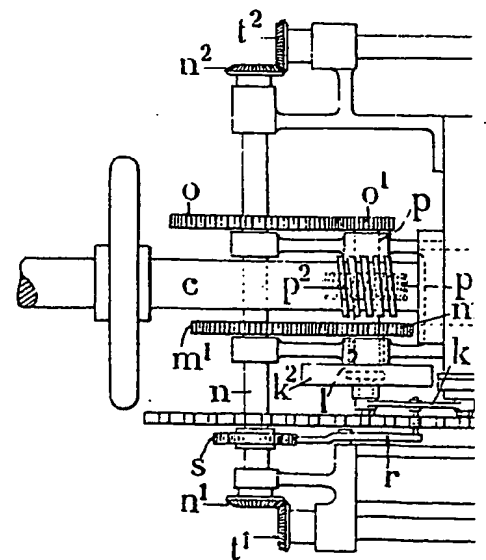
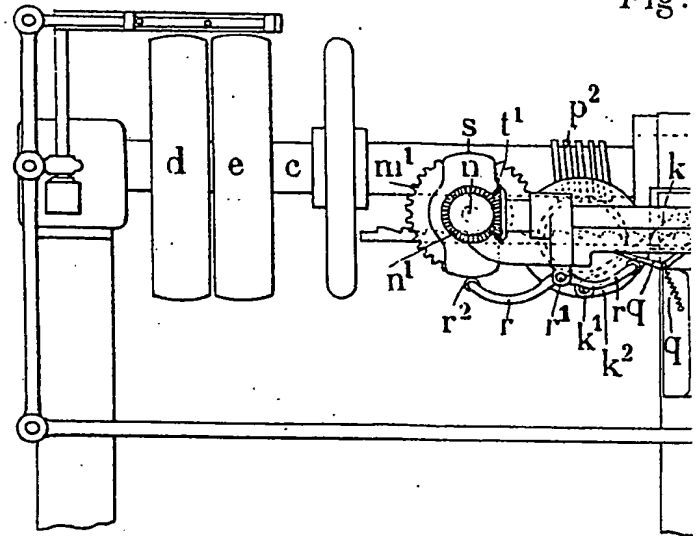


Fig.1.

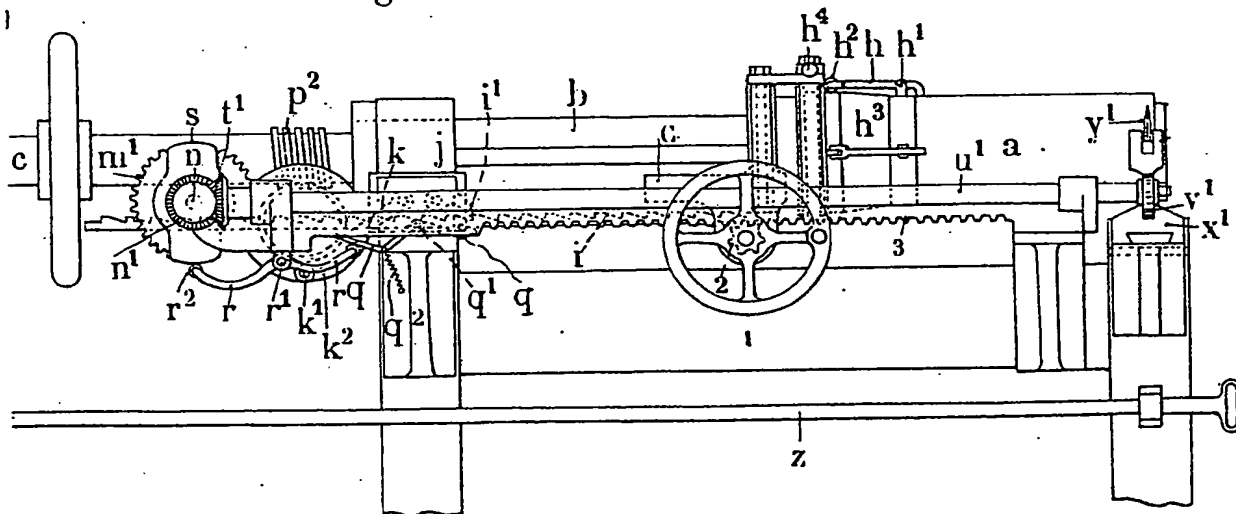
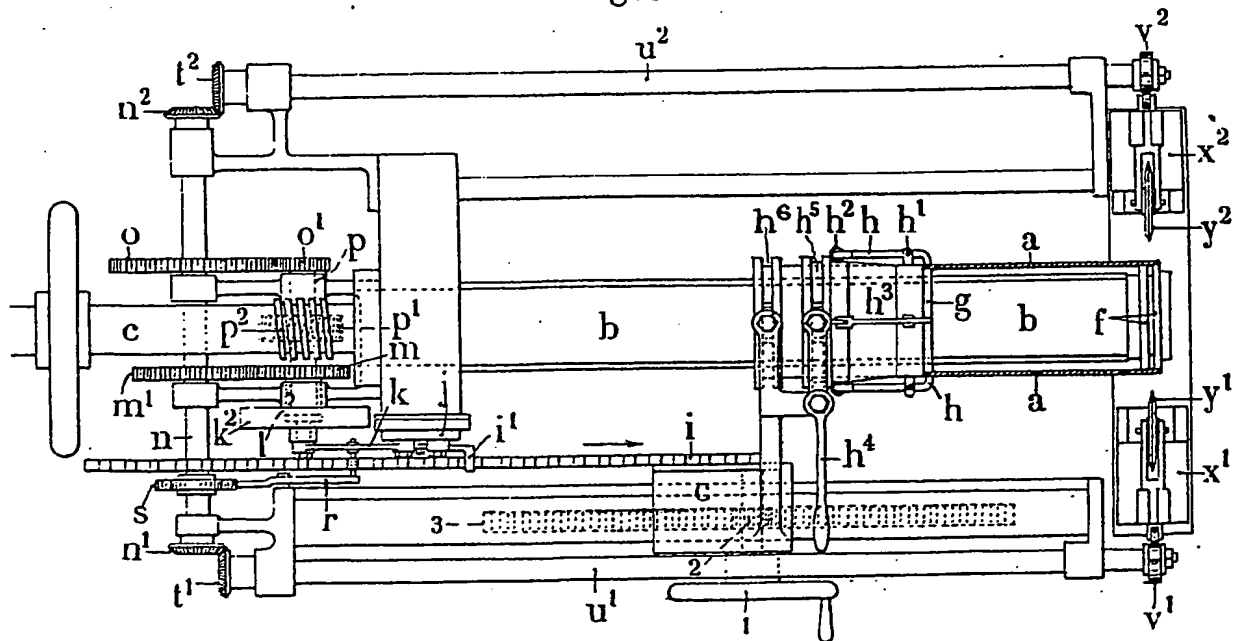


Fig.3.



[This Drawing is a reproduction of the Original on a reduced scale.]

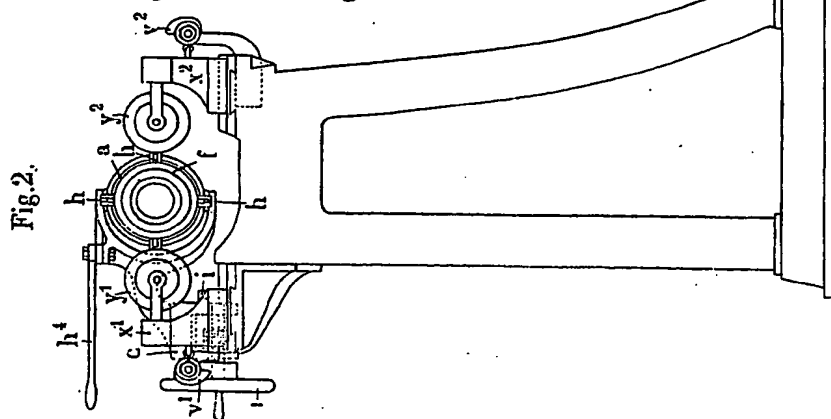


Fig. 2.

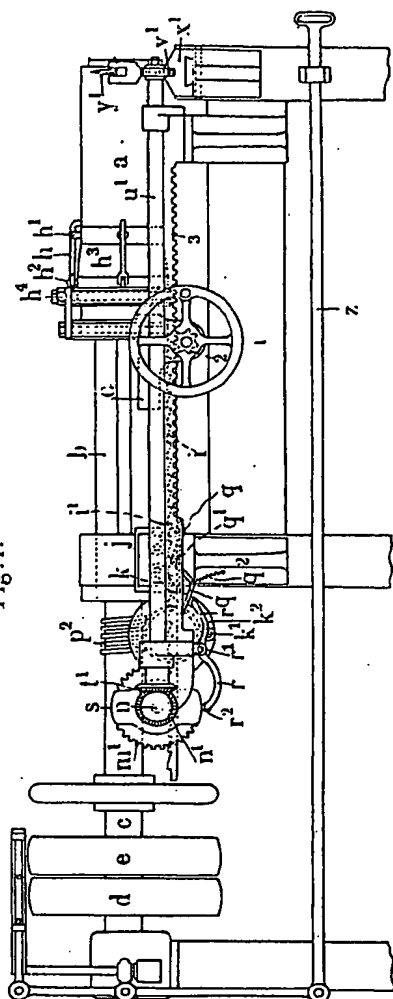


Fig. 1.

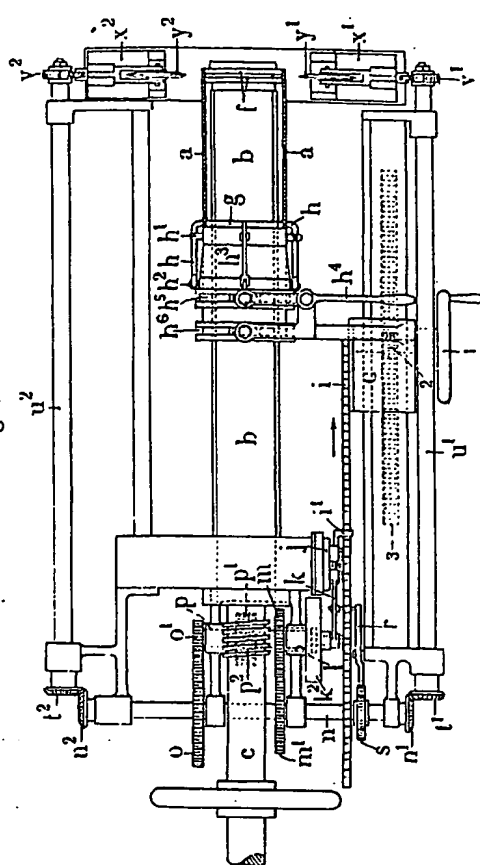


Fig. 3.